

III. SURFACE WATER ASSESSMENT

C. ASSESSMENT METHODOLOGY AND ASSUMPTIONS

1. Methodology for Determination of Use Support Status

The Assessment Methodology describes which monitoring activities are used and how resulting data and information are interpreted to calculate an assessment of water quality and determine the level of support of designated uses. As noted in Section II.B.2., the State has adopted water quality standards which define the water quality goals for the state's waters by deciding what their uses will be (designated uses), setting criteria necessary to protect those uses and by developing policies to prevent degradation of water quality. Within Rhode Island's Water Quality Regulations are numeric water quality criteria which represent parameter-specific thresholds for acceptable levels of substances in waters of the state. For other parameters, the standard is more descriptive (narrative) in nature (e.g. "no toxics in toxic amounts"). All readily available water quality data and information from a variety of sources including state, federal and local agencies; universities and volunteer monitoring organizations, is utilized to determine the waterbody assessment status. The ambient data collected by these various sources are compared to the water quality criteria and standards to evaluate for criteria exceedances. The data are also evaluated for quality based upon QA/QC protocol followed, detection limits, frequency of sampling, etc. All of this data and information is then used to arrive upon an assessment and determine the level of use support. The specific criteria for determining status of the individual uses is described below in Section C.3, Use Support Categories.

Most of the baseline monitoring data utilized for the assessments consists of quarterly and seasonal sampling programs. As such, measurements of instantaneous concentrations (grab samples) for physical and chemical parameters were assumed to represent the averaging periods specified for ambient criteria. In addition, a single monitoring station is often considered representative of the waterbody for a distance upstream and downstream where no significant influences exist that might tend to change water quality or biological and habitat quality. For lakes, a single sampling station (generally collected at the deepest point of the lake) at which data is collected seasonally is considered representative for the entire lake. It is important to note that waterbodies were assessed based on either biological data only, chemical data only, or at some sites both chemical and biological data were available for the assessment. Aquatic Life Use assessments were often determined based upon only one or a few chemical (conventional and/or toxic) parameters for which ambient data was available. Generally assessments based upon such limited data were considered "evaluated" assessments.

During the summer of 2000 a statistically determined sampling project was conducted where biological and chemical data were collected at 48 randomly selected river sites around the state. At the time the assessments were being conducted, only the chemical data from this project were available. As such, the state cannot make any statistically derived, comprehensive statements about the condition of the entire states' waters. Furthermore, because the data consisted of

only grab samples collected once in one year, the data was used to determine an “evaluated” assessment of use support status in accordance with the assessment methodology protocol.

The protocol used for the determination of use support in Rhode Island’s surface waters generally follows the EPA 1998 305(b) assessment guidance entitled *Guidelines for Preparation of Comprehensive State Water Quality Assessments (305(b) Report) and Electronic Update*, September 1997. The 305(b) guidance suggests following the policy of Independent Application when making use support decisions. According to this policy, if any one of the three types of monitoring data (biological, chemical, or toxicological) indicates impairment of water quality standards, this should be taken as evidence of impairment (partially supporting or not supporting) regardless of the findings of the other types of data. Since this is currently just EPA guidance, states have the authority to use BPJ when making use support decisions where independently applied biological, chemical, or toxicological data suggest different assessment results. In most instances, we have chosen to rely more heavily on the biological data, where available, to determine aquatic life use support status. EPA has recently enhanced the guidance on, and use of, biological data in making use support decisions. This guidance on use of biological data follows a tiered approach based on level of confidence in the data. Rhode Island has increased biological monitoring of rivers and streams specifically following EPA's Level II Rapid Bioassessment Protocol (RBP).

2. Assessment Level

Assessed waters are those waterbodies for which the state makes use support decisions based on actual information. Such waters are not limited to waters that have been directly monitored since it is appropriate in many cases to make best professional judgements based on other information including extrapolating an assessment to apply to an up or down stream site. To encourage reporting on more waters, and to distinguish between assessment bases, EPA has subdivided the term "total assessed waters" into two categories and requests that assessments be classified as either:

- i. Evaluated waters - those waterbodies for which the use support decision is based on information or data collected over 5 years ago; is based on qualitative information or BPJ; consists of infrequently collected data (less than quarterly sampling frequency for rivers and less than seasonally for lakes), limited data (single parameters), land use data, location of pollution sources, citizen complaints, non-quality assured citizen monitoring data, etc.
- ii. Monitored waters - those waterbodies for which the use support decision is principally based on data collected within the previous 5 years with adequate QA/QC and a minimum of quarterly chemical sampling frequency for rivers, seasonally for biological data and lakes monitoring, includes: fixed and non-fixed station data, instream 24 hour survey sampling data, and artificial substrate or Rapid Bioassessment Protocol evaluations.

Table 3C-1 presents the 2004 summary of waterbody sizes monitored and

evaluated.

TABLE 3C-1 2004 Summary of Waterbody Sizes Monitored and Evaluated

Waterbody Type	Units	Size Monitored	Size Evaluated	Total Assessed
River	Miles	428.79	140.92	569.71
Lake	Acres	11,331.48	5,410.76	16,742.24
Estuarine	Square Miles	154.41	1.82	156.23

3. Use Support Categories

In accordance with Section 305(b) of the CWA, state's are required to survey their water quality for attainment of the fishable/swimmable goals of the Act. The attainment of the CWA goals is measured by determining how well waters support their designated uses. For the purposes of this report, the following five designated uses (See Table 3C-2) were evaluated:

- Aquatic Life
- Shellfishing
- Swimming
- Fish Consumption
- Drinking Water Supply

The State's water quality standards are then used to categorize waters as "Fully", "Partially", or "Not" supporting specific designated uses. Partially and Not Supporting use assessments are collectively considered "Impaired" water quality conditions. Table 3C-3 gives a general description of the levels of use support. In the assessments, use support status is determined by comparing available water quality information to the water quality standards.

There are specific criteria for determining status of the individual designated uses. EPA guidance discusses the criteria and protocol that should be followed in the assessment methodology. In general, our assessment methodology follows the EPA guidance. The designated uses are assessed independently in the following manner:

i. Aquatic Life - Aquatic life use assessments were based on chemical data or biological data or a combination of chemical and biological data. Available water chemistry data were evaluated for conventionals (dissolved oxygen, pH, temperature, secchi depth, chlorophyll a) and toxicants (priority pollutants) concentrations and compared to applicable water quality criteria. Biological data were evaluated based on physical habitat and biological (macroinvertebrate) community relative to a reference station. The use is considered **fully supporting** when the data indicate an attainment of acute aquatic life criteria (no more than one exceedance of the criteria in a three year period) and biological evaluations show no evidence of community modifications. Minor exceedances of chemical criteria may be out-weighted by biosurvey results which demonstrate support of the use. The use is **partially supported** when the macroinvertebrate population indicates less than full support through any apparent moderate modification of the community. Waterbodies are categorized as partially supporting the use if, for any one pollutant, there is an exceedance of the water quality criteria (acute or chronic) more than once in 3 years but in $\leq 10\%$ of the samples. The use is considered **not supporting** if there is severe adverse modifications of the biological community and/or there are severe or frequent ($>10\%$ of the samples) violations of the chemical water quality criteria.

ii. Shellfishing - Shellfish harvesting use assessments are based on bacteriological monitoring data of the shellfish harboring waters of the state as supplied by the OWR's Shellfish Growing Area Monitoring Program. The use is considered **fully supporting** when there are no shellfishing restrictions in effect. The use is **partially supported** when

the waterbody has a seasonal or conditional closure associated with it. The use is **not supporting** when the waterbody is permanently closed to shellfishing. There are several estuarine areas that are closed to shellfishing strictly due to policy closures. In those areas where the actual water quality attains the shellfish standards, the shellfishing use is considered fully supporting.

iii. Drinking Water Supply - Drinking water use assessments are conducted by and based upon data supplied by the RI Department Of Health (RIDOH). The data consists of ambient (source) water quality data, and information about the level of treatment required and finished water quality. The use support status was based on violations of the MCLs, use restrictions, and/or best professional judgement (BPJ) by the DOH staff. Waters were considered **fully supporting** when there were no violations of MCLs and no restrictions or advisories, and no requirement of more than conventional treatment. **Fully supporting but threatened** was applied to waters which met criteria but where the integrity of the drinking water supply system was considered threatened by nonpoint sources of pollution, often resulting in occasional taste and odor problems and/or in waters where regulated contaminants were detected but not above the MCL. This category was applied to one drinking water supply where the naturally dark color of the reservoir, due to tannic acid staining, required additional treatment. The use was considered **partially supporting** where one or more parameters violate the MCLs, treatment beyond conventional treatment may be required, and frequent taste and odor problems occur. The use was considered **not supporting** if many and frequent violations of the MCLs were observed and one or more contamination-based closures of the source water occurred.

iv. Swimming - The assessment of swimming use was based on fecal coliform bacteria data. The use was considered **fully supporting** when bacterial criteria (geometric mean is met) for primary contact were attained. **Partially supporting** was applied to waters where the geometric mean was met but more than 10% of samples exceeded 500MPN per 100mL. The use was considered **not supporting** if the geometric mean was not met.

v. Fish Consumption - The assessment of fish consumption is still under review and development by the state due to the limited data available. For this report, the use was considered **impaired** where there was a "no consumption" of fish in effect for the general population for one or more fish species. Fish consumption use for all other waterbodies is considered unassessed at this time.

TABLE 3C-2

DESIGNATED USES

Aquatic Life - The waterbody provides suitable habitat and water quality for survival and reproduction of desirable macroinvertebrates and supports a healthy macroinvertebrate community.

Shellfish Harvesting - The waterbody supports a population of shellfish and is free from pathogens that could pose a human health risk to consumers.

Drinking Water Supply - The waterbody can supply safe drinking water with conventional treatment.

Swimming - People can swim or engage in other primary contact recreational activities in the waterbody without risk of adverse human health effects.

Fish Consumption - The waterbody supports fish free from contamination that could pose a human health risk to consumers.

TABLE 3C-3

LEVELS OF USE SUPPORT

USE SUPPORT LEVEL	WATER QUALITY CONDITION	DEFINITION
Fully Supporting	Excellent/Good	Water quality meets designated use criteria.
Fully Supporting but Threatened	Good	Water quality supports beneficial uses now but may not in the future unless action is taken.
Partially Supporting	Fair (impaired)	Water quality fails to meet designated use criteria at times.
Not Supporting	Poor (impaired)	Water quality frequently fails to meet designated use criteria.
Not Attainable	Poor	The state has performed a use attainability study and documented that use support is not achievable due to a natural condition or human activity that cannot be reversed without imposing widespread economic and social impacts.

4. Section 303(d) Waters

Section 303(d) of the CWA requires that each State identify waters for which existing required pollution controls are not stringent enough to achieve State water quality standards. The section 303(d) list provides a comprehensive inventory of waterbodies impaired by all sources, including point sources, nonpoint sources, or a combination of both. These waters are referred to as "water quality limited." Rhode Island develops this list from the 305(b) assessments. Any waterbody which has a partially or not supporting assessment for any designated use, is placed on the 303(d) List.

States are required to rank their water quality-limited segments by priority and establish Total Maximum Daily Loads (TMDLs) for them. The TMDL process provides an analysis and identification of the relative contribution of each source to the impairment. The TMDL also identifies the sources and causes of pollution or stress, e.g., point sources, nonpoint sources, or a combination of both, and establishes allocations for each source of pollution or stress as needed to attain water quality.